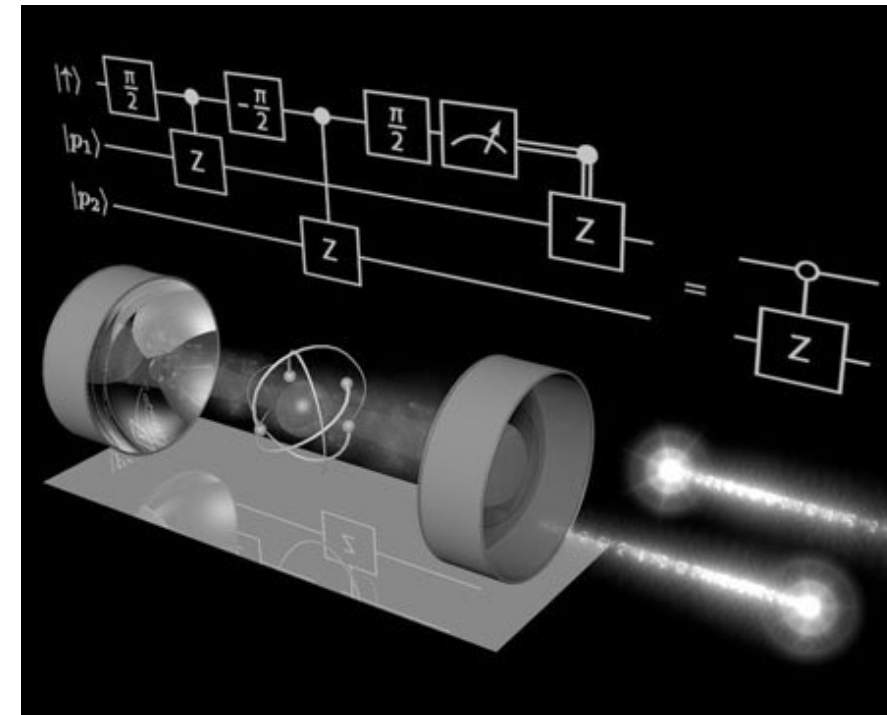


QuSiED: Quantum Simulation with Engineered Dissipation

Motivation

- Quantum atom-light interfaces are important foundation for quantum technologies:

- Platform for q. simulation
- Q. communication and logic
- Q. metrology and sensing



Novel approach

- Wave interference: emission is complicated function of atom number and positions
- Strong correlated dissipation to achieve

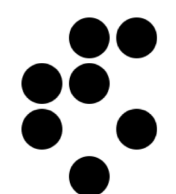
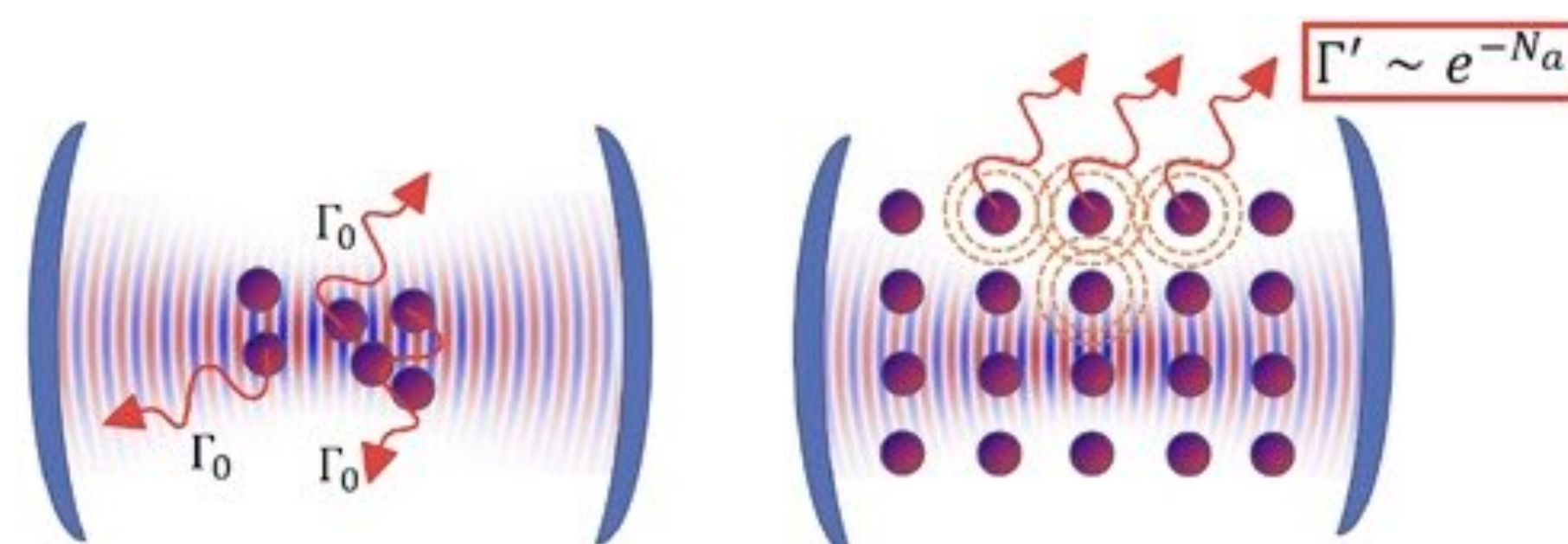
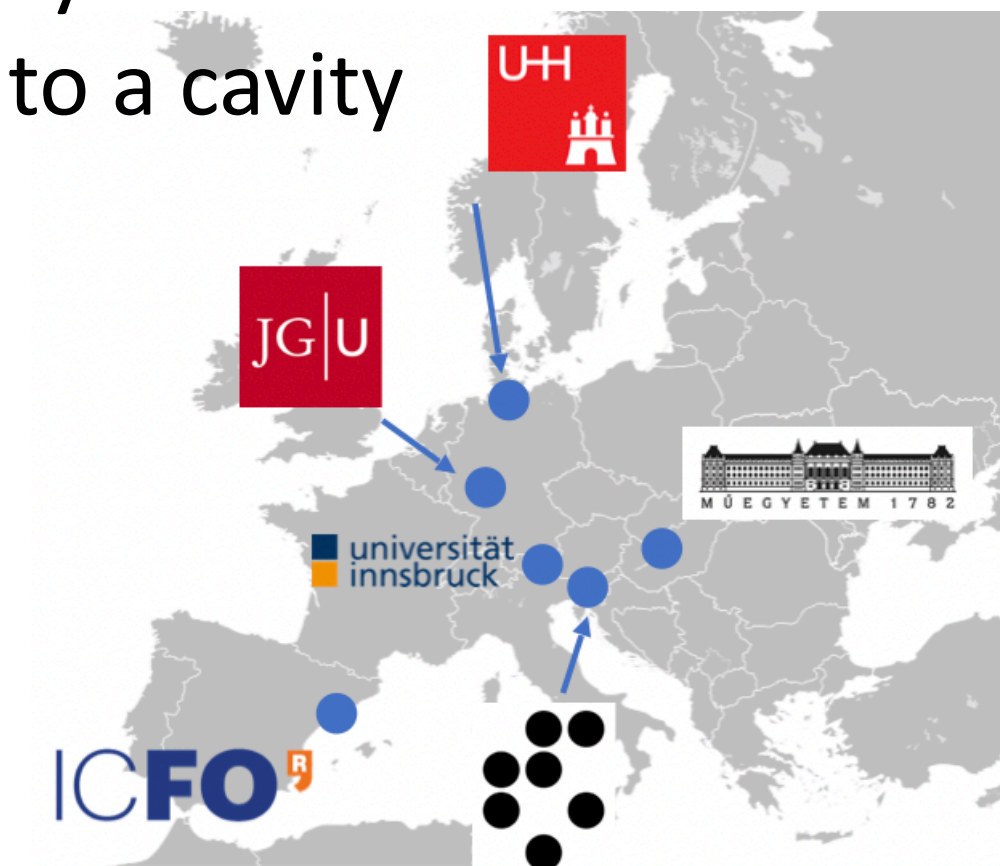
$$\Gamma(N, \{r_i\}, |\psi\rangle) \rightarrow 0$$

- Polynomial or exponential improvements** in errors/ infidelities

Key limitation: uncontrolled dissipation

Key objectives

- Integrated cavity tweezer array with Yt atoms
- BEC/Mott insulator coupled to a cavity
- Novel theoretical tools
- Quantum metrology
- Novel dynamical phases
- Quantum photon memory



Jožef Stefan Institute

PI/Coordinator: Zala Lenarčič



Budapest Univ. of Technology and Economics

PIs: Gergely Zaránd, Géza Tóth



University of Innsbruck

PIs: Hanns-Christoph Nägerl, Manuele Landini



ICFO

PI: Darrick Chang



Johannes Gutenberg Univ. Mainz

PI: Jamir Marino



Hamburg University / ILP

PI: Andreas Hemmerich